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THE MALONE LAKE CANOE: AN HISTORIC CRAFT FROM THE
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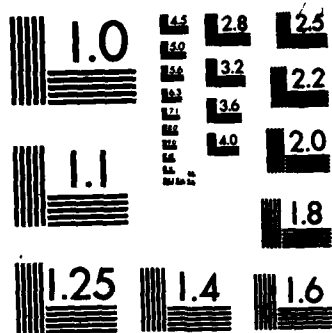
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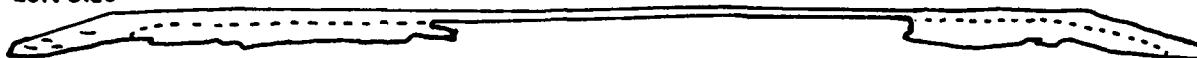
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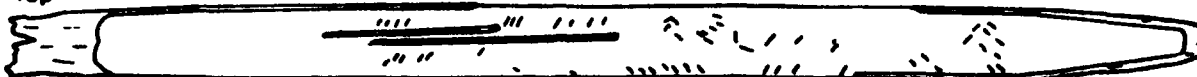
THE MALONE LAKE CANOE

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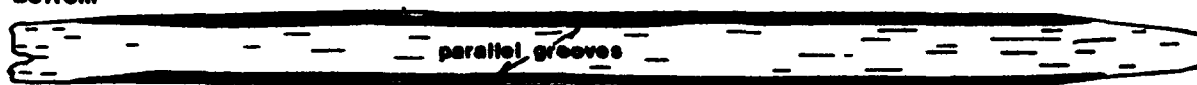
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Top



Bottom



Right Side



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By: Barbara A. Purdy, Raymond F. Willis, and George MacDonald

Contributions by Judith A. Bense

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concentrations of polyethylene glycol.

The canoe was constructed from cypress (Taxodium sp.), with metal tools, and later had been vandalized. The canoe is 7.3 m (23.9 ft) long with a square stern and pointed prow implying a unidirectional type of craft. Two recessed parallel bottom channels are present which are stabilizing "keel-like" mechanism for operating in a flowing riverine environment.

Historical research indicates a 291-year period from 1541-1832 in which the canoe could have been built aboriginally using metal tools and a radiocarbon date of 280 ± 50 years was obtained from a gunwale section. The probable construction date is late 18th to early 19th century. Cultural affiliation is not certain and it could have been constructed by late Chickasaw, white frontier, or black frontier populations.

(12)

THE MALONE LAKE CANOE:
AN HISTORIC CRAFT FROM THE
TOMBIGBEE RIVER, MISSISSIPPI

FINAL REPORT

The Tennessee-Tombigbee Waterway: The Tombigbee River Multi-Resource District

by

Raymond F. Willis, Barbara A. Purdy, George F. MacDonald

with contributions by Judith A. Bense, Principal Investigator

A report prepared in cooperation with the U.S. Army Corps of Engineers,
Mobile District

Contract Number DACW01-80-C-0063

Report of Investigations No. 1
The Office of Archaeological Contracts
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ACKNOWLEDGMENTS

The canoe project was an unexpected and interesting addition to an otherwise prehistoric project investigating the early occupations of the Upper Tombigbee Valley. Many individuals have been instrumental in the canoe preservation project. The Maharrey/Houston Construction Company from Memphis, Tennessee was responsible for sending workmen out to search for the rumored canoe after partially draining Malone Lake. U. S. Army Corps of Engineers Inspector Jerry W. Knapp located the canoe. The Lock A engineer staff is to be commended for their aid and help in stabilizing and maintaining the canoe for six months. These persons include Mr. J. Leo Phillips, Resident Engineer, Mr. Billy R. Pannell, Office Engineer, and Mr. Bradley Dean Middleton, Inspector.

The archaeological staff which aided in this canoe project should also be thanked and recognized. These included Mr. Eugene Johnson who supervised the construction of the preservation vat and maintenance of the system, Mr. Murray E. Seals, photographer, Ms. Marcia Montgomery and Ms. Cristi Winchell, crew members. In addition, Mr. Joe L. Brown and his son Glen quickly excavated the holding trench for the canoe and this is appreciated.

The professional specialist team of Dr. George F. MacDonald, Dr. Barbara A. Purdy, and Mr. Raymond F. Willis gave continual guidance throughout the stabilization, proposal, transportation, and finally preservation stage of this project. Their advice was sound and made easy to follow. Helpful information was generously supplied by Mr. Sam D. McGahey, Archaeologist, Historic Preservation, Mississippi Department of Archives and History. Mr. McGahey provided unpublished information, hard to find articles, and notes on canoes in Mississippi. His help is greatly appreciated and it added to the scope of this report.

ABSTRACT

A dugout canoe was removed from Malone Lake, Monroe County, Mississippi in July 1980 during draining by the U. S. Army Corps of Engineers (USCOE). After initial documentation of the condition of the canoe, it was placed in a temporary water filled, plastic-lined earthen trench at Lock A USCOE in Amory, Mississippi. In February 1981 the canoe was transported to the University of West Florida Archaeological Laboratory in Fulton, Mississippi, carefully examined, and placed in a fiberglass-over-plywood vat. The canoe then underwent a preservation treatment which consisted of submersion in increasing concentrations of polyethylene glycol.

The canoe was constructed from cypress (Taxodium sp.), with metal tools, and later had been vandalized. The canoe is 7.3 m (23.9ft) long with a square stern and pointed prow implying a unidirectional type of craft. Two recessed parallel bottom channels are present which are stabilizing "keel-like" mechanism for operating in a flowing riverine environment.

Historical research indicates a 291-year period from 1541-1832 in which the canoe could have been built aboriginally using metal tools and a radiocarbon date of 280 ± 50 years was obtained from a gunwale section. The probable construction date is late 18th to early 19th century. Cultural affiliation is not certain and it could have been constructed by late Chickasaw, white frontier, or black frontier populations.

INTRODUCTION

This document is a report of the Malone Lake dugout canoe. The canoe was first seen by archaeologists in July 1980. It was examined and prepared for preservation in February 1981 and removed in December 1981. Three consultants in this specialized field guided and/or performed all activities: Dr. George F. MacDonald, Senior Archaeologist, Museum of Man, Ottawa, Canada; Dr. Barbara A. Purdy, Associate Professor and Raymond F. Willis, Graduate Assistant, Department of Anthropology, University of Florida, Gainesville. The canoe was recovered during construction operations of the pool above Lock A of the Tennessee-Tombigbee Waterway in former Malone Lake a trapped oxbow of the Tombigbee River in Monroe County, Mississippi. The study and preservation of the Malone Lake Canoe were funded by the U. S. Army Corps of Engineers as a modification of existing Contract DACW01-80-C-0063. The research design is attached as Appendix A to this report.

Upon its discovery in July 1980, Dr. Judith A. Bense, Principal Investigator, of the University of West Florida's field laboratory in Fulton, Mississippi visited the site and described the craft and its immediate vicinity. A storage trench was then excavated and lined with plastic and filled with water to protect the canoe from degradation until it could be studied and preserved.

The craft was examined in February 1981 under laboratory conditions and a detailed technological report about its physical construction, function, and present condition was compiled. The historical significance and relationships of the canoe were researched. Preservation steps began at this time and continued until December 1981.

The radiocarbon date obtained from a gunwale fragment of the canoe dated at 280 B.P. \pm 50 or 1620-1720 A.D. (Dicarb Number 1899). This is well within the period of active contact among whites in the area. Technical examination of the craft indicates it was constructed with metal tools from a single cypress log and designed for unidirectional motion in flowing water. The canoe was preserved in a bath of increasing concentrations of polyethylene glycol (Carbowax 1000).

LOCATION AND FIELDWORK

The dugout canoe was located in the southeast portion of Malone Lake (Figures 1 and 2). Malone Lake is a trapped, former oxbow of the Tombigbee River and is situated in the active floodplain approximately one mile (1.6 km) north of Amory, Mississippi. Malone Lake is located in the deepest portion of a former lake bed at least a mile (1.6 km) in diameter that existed during the recent Neo-Ice Age approximately 200-600 years ago (Muto 1981: personal communication). It appears that the presence of the canoe in Malone Lake was known by local fishermen who had seen it protruding from the side of the lake during low stands of the lake. This was communicated informally to the engineering and construction staff at Lock A of the Waterway. This was not communicated, however, to the Environmental Resources Branch of the Mobile District Corps of Engineers or the Principal Investigator of this archaeological project. It was also heard secondarily from the staff at Lock A that the canoe had been moved from a former unknown location to the current landing of the lake. This statement could not be verified; however, the canoe was recovered near the landing area of Malone Lake.

The impact of Waterway construction on Malone Lake consisted of placing a dam or levee across the lake at the midline and draining the water out of the southern portion. Once the water had been pumped out, workmen from the construction company (consisting of several local residents) were sent out in search of the canoe. When it was located, it was removed by approximately six men and placed on a trailer. This trailer was too small for the long craft and the bow and stern extended well beyond the trailer edges. It was then hauled out of the construction area by truck to the engineering compound at Lock A and parked in the open. The small area (approximately a 5 m square) from which the canoe was removed was flagged and avoided.

Four days later, the Principal Investigator was notified by the Mobile District Corps of Engineers of the canoe and travelled to the Lock A compound. During this initial visit it was obvious that the 100° plus July heat was drying out the canoe and a water sprinkler was immediately placed on it. The craft was documented by scale drawings of the topside and gunwales and photographed.

After consultation with Corps of Engineer officials, it was decided to place the canoe in temporary storage while a mitigation plan could be designed

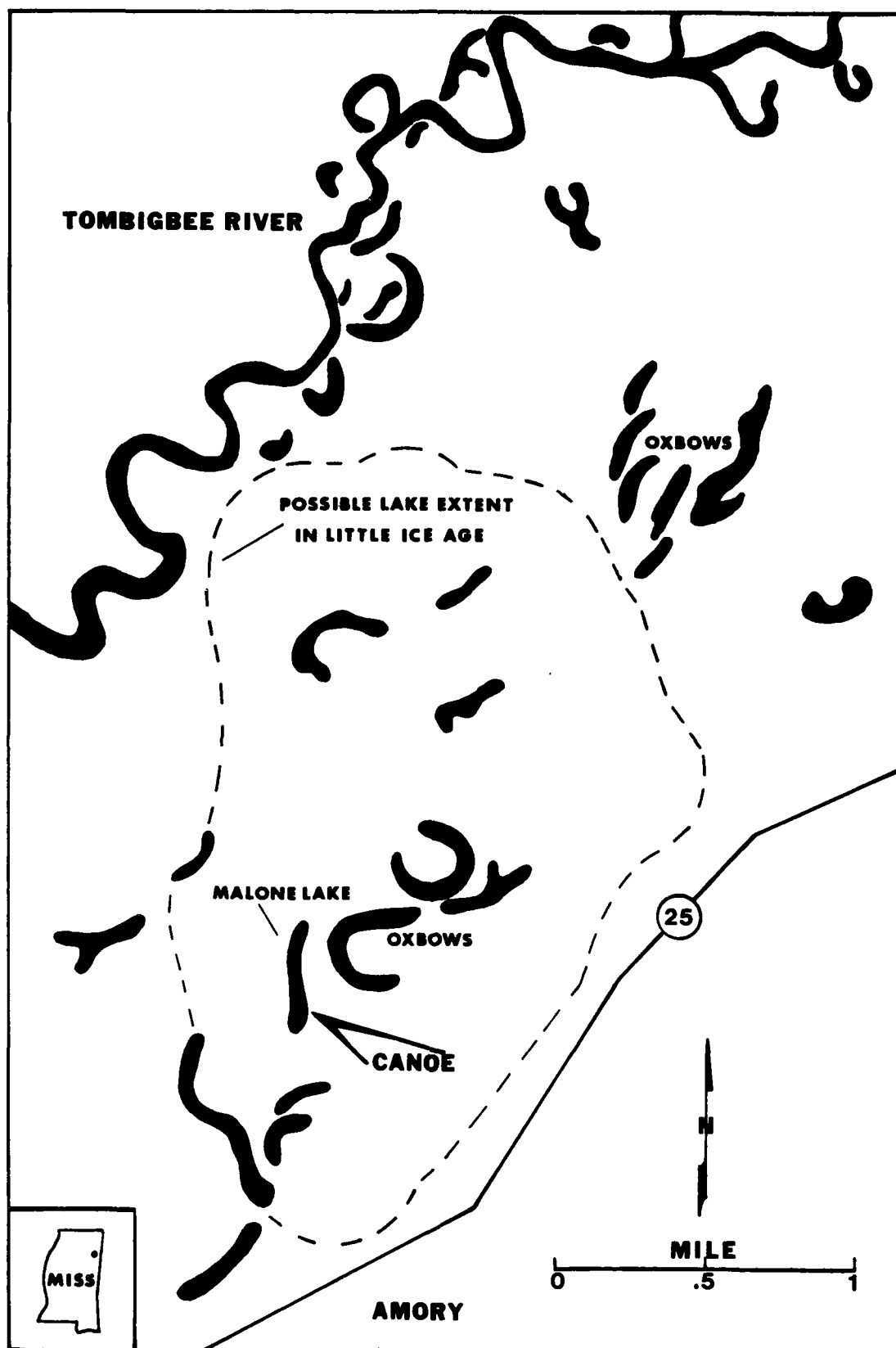


Figure 1. Canoe Location Map.

and implemented. The next day, the Principal Investigator directed the excavation of a backhoe trench in the compound to hold the canoe. The trench was approximately one meter wide, 8 meters long, and 1.5 m deep. The trench was lined with visquine plastic and the canoe placed on a ladder-like rack in the bottom of the trench. The trench was filled with water and the craft weighted down. Plywood was placed over the top to prevent debris from entering the holding trench.

The canoe remained in this trench for eight months (July 1980 through February 1981). The engineering staff at Lock A kindly monitored the water level daily and kept it above the canoe.

Several days after the submersion of the canoe in the holding trench, the Principal Investigator returned with a field crew to the site of discovery of the canoe. At that time the vegetation had been cleared, the entire area root-raked, and digging with scraperpans and bulldozers was underway. These activities had significantly altered the former terrain except for the impression in the mud of the canoe which had been preserved.



Figure 2. Malone Lake: The remaining unaltered northern portion

The purpose of the fieldwork was to record the canoe location site. The area was to be described and the position of the canoe in relation to the lake bed was to be determined if possible.

The canoe impression was quite visible in the lake bottom. It measured 6.4 m long and 50-55 cm wide. Miscellaneous wood debris was in both the bow and stern portions of the impression. The lakeside border of the impression and the ends were disturbed by removal. No recognizable fragments of the canoe remained in place.

The sediments in which the canoe rested consisted of mixed wood debris (branches, trunks, bark, etc.). The canoe lay in the bank, resting on a thin (3-4 cm) layer of well-sorted and rounded pea gravel overlying a blue-grey coarse sandy stratum.

It could not be determined if this was the original location of the canoe or if it had been placed there recently. Recent moving is suspected due to the facts that little sediment was present in the canoe when discovered (2-5 cm) by the workmen and it was located near the modern landing.

A cross-section of the impression was made and it revealed a thick (20-50 cm) deposit of mixed wood which had moved downslope from waterlogging of the normal tree pruning debris.

Fieldwork determined that the canoe apparently was resting on and partially in the base of the slope of the lake. The slope continued upwards from 2 m at 30-35 degrees to the former land surface. It is inferred from this that when the lake was full of water, the canoe was submerged 2 m below the surface. The nature of the lake bed could not be discerned; however it appears that the bottom sloped at a low degree (2-5) to the lowest point, likely along the midline of this former river channel segment. The canoe was apparently resting at the interface of the lake bed and the steeply sloping sides. Scale drawings and photographs were made of the entire area during the fieldwork.

During the following eight months, a preservation vat was constructed under the guidance of the project consultants. The canoe was removed from the temporary holding trench on February 13, 1981. This was during a cold snap and ice had formed in the trench and was holding the canoe to the mud which had accumulated at the base of the trench up to 50 cm deep. This was melted by spraying hot water on it and removing the mud by hand, thereby releasing the canoe and the rack upon which it was resting. A crew of 16 persons was assembled and the waterlogged canoe was lifted and pulled by hand out of the trench onto the surface. It was then placed in a furniture van with air-cushioned shock absorbers

and transported to the laboratory (Figure 3) in Fulton, Mississippi, approximately 30 miles to the north.

Through all of the activities involved, the craft was undamaged. It was placed in the preservation vat after analysis in the laboratory and today is preserved in its original state of discovery. This fact is a tribute to both the durability of the vessel and the ingenuity of the project consultants and staff.



Figure 3. Dr. George MacDonald shown conducting technical examination of the canoe.

TECHNICAL DESCRIPTION OF THE CANOE

The canoe is illustrated in the scale drawing (Figure 4) which includes top, bottom, and gunwales. The dimensions are as follows:

Length: 7.3 m (23.9 ft)

Maximum width: center 40 cm (1.3 ft); bow 20 cm (0.7 ft); stern 35 cm (1.14 ft)

Height of sides: indeterminable

Bow: Short lip 10 cm (0.3 ft); slanting bottom inside craft for 20 cm (0.7 ft) with squared off narrow end 20 cm (0.7 ft) wide (Figure 5a).

Stern: Long lip 35 cm (1.1 ft); slanting bottom inside craft for 15 cm (0.5 ft) with squared off end (Figure 5b).

Bottom: The bottom angles upward for 85 cm (2.8 ft) at the bow and 50 cm (1.6 ft) at the stern. Two parallel troughs have been cut almost beneath the gunwales for the entire length of the canoe (Figures 7a and 7b). There are few tool marks on the underside but many on the upperside of the craft.

Sides: The sides (gunwales) are almost completely eroded with only fragmentary remains indicating they probably rose no higher than the bow or stern platforms.

The gunwales of the canoe, particularly on the starboard side, are too deteriorated to show evidence of manufacture or use. Where the canoe was buried in the silt of the lake bottom, the wood surface is well preserved and free of wood parasites. The bow was evidently buried in the silt as it is in an excellent state of preservation, particularly the first meter of its length. Some etching of the end grain of the bow is evident, but this process had probably begun while the canoe was still in use.

Between the bow and the stern the gunwales are either missing, broken off or badly deteriorated. Where preserved they are almost vertical on the outside but battered inwards for extra strength on the inside (Figure 3).

The stern of the canoe is rounded with a standing platform overhanging the end. Erosion of the grain at this point is extensive, indicating that it was exposed above the silt for a long period. The stern platform length and low gunwales indicate that this canoe was intended for use with the aid of poles rather than paddles, although the latter may have been used with the canoe on some occasions, such as when there were many people in the craft.

The bottom of the inside of the canoe is flat and was evidently completely buried in the silt for most of its history. The marks of axes are clearly preserved on both the upper and lower surfaces of the bottom (Figures 6a and 6b). Most of the information on canoe manufacture was derived from this portion of the craft. The use of a steel axe in the manufacture of the canoe is clearly

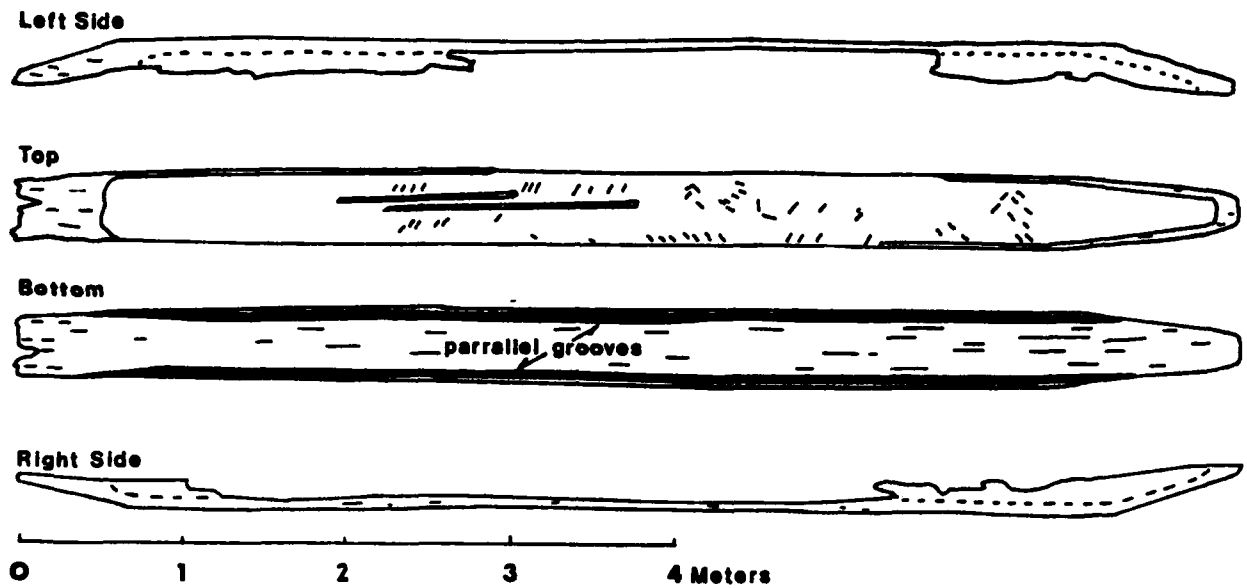


Figure 4. Scale Drawing of the Malone Lake Dugout Canoe.



Figure 5a. Bow.

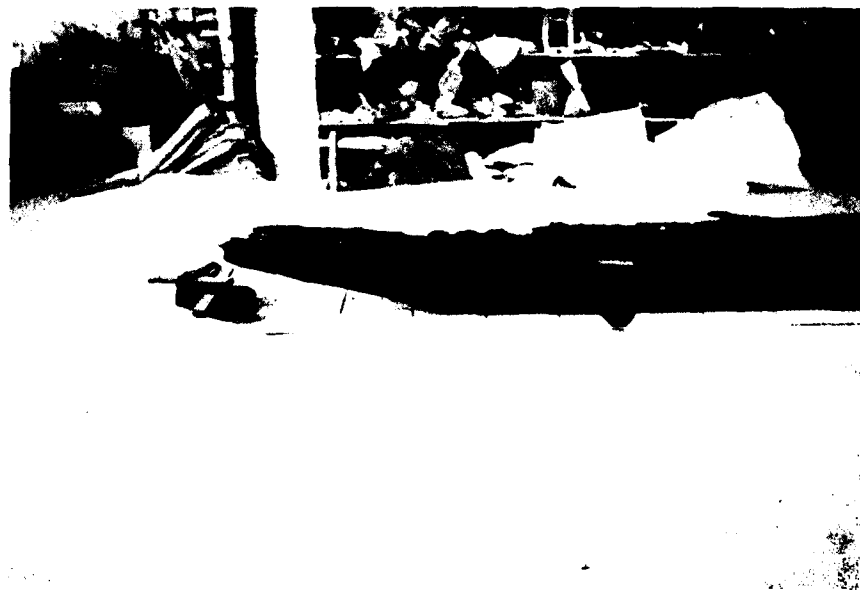


Figure 5b. Stern.

indicated. The sharp edges of cut marks five to eight centimeters long in length, in MacDonald's opinion, could only be made with a steel axe (see Figure 6a and 6b). The cuts are narrow and deep and completely straight throughout their length. Stone axes are incapable of such cutting and even shell adzes leave wider cuts, usually with a noticeable curvature in their length.



Figure 6a. Metal tool (axe) manufacture marks.

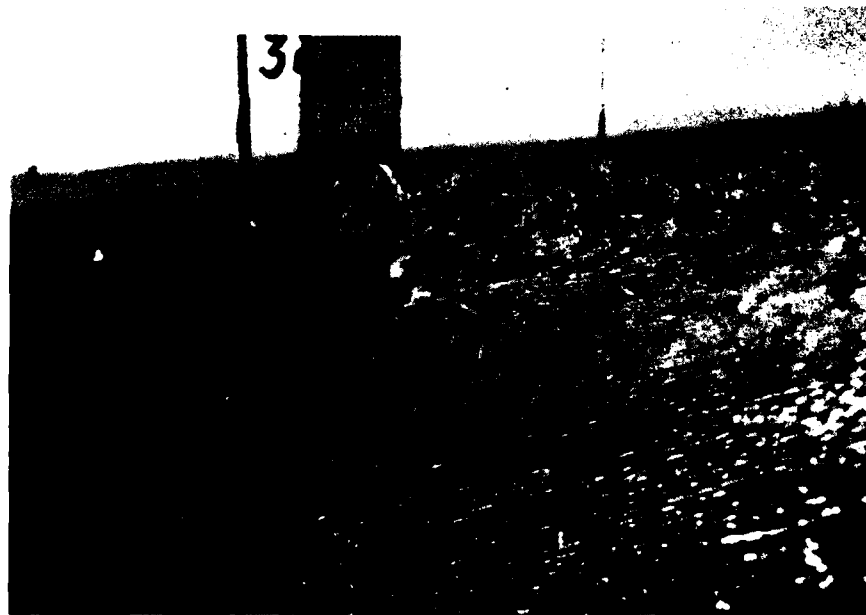


Figure 6b. Metal tool (axe) manufacture marks.

MANUFACTURING HISTORY

The canoe was made from a large cypress log (Taxodium sp.) with very few large knots. Many tiny knots have been exposed by erosion of the wood, which indicates that the parent tree grew in a closed forest condition with an almost exclusive top growth pattern, whereby side limbs soon atrophied.

None of the original surface of the tree, or the bark, survive on the canoe. The surface has been completely trimmed. Areas on the outer edges of the stern platform, and on the outer edges of the bottom are closest to those of the original surface. It is these areas that would be sampled for any additional dating materials, particularly for dendrochronology.

Although a tree ring count has not been done, a reliable estimate for a minimum age of a cypress of this diameter (45 cm; 1.5 ft) would be approximately 100 years. The shaping of the canoe appears to have been done primarily by a steel axe or hatchet. In at least ten places on the upper surface of the bottom a series of parallel cuts can be clearly seen (Figures 4 and 6). Typically, there are seven to ten cuts in each set, averaging four to five centimeters in length and 50-60 cms apart. Each set indicates that the technique similar to squaring timber was used. That is, a series of cross-grained, parallel cuts were made in a line or arc that is defined by the comfortable reach of the arm in working. This is to break the grain and prevent splits from traveling too deep into the bottom. The second step consists of splitting off the pieces isolated by the cuts, by turning the edge of the axe from a vertical to a horizontal position. This is a very efficient way to quarry wood from a log. It is possible that this technique was learned from Euro-Americans at the same time as the steel axe was acquired. Its use in prehistoric times with shell fitted adzes is indicated, however, at the Hontoon Island site (Purdy and MacDonald n.d.). There is some evidence that an adze with a curved bit may also have been used in the manufacture of the canoe, since the interior of the prow has a smooth concave surface. Such work is difficult to accomplish with a straight edge tool. Where the "chop against and split with the grain" technique was not used, or at least not well controlled, long splits did run deep into the canoe bottom where they eventually broke out in ragged step fractures of the wood. At least ten examples of such poorly controlled splits along the grain were noted on the two surfaces of the canoe bottom. None had run deep enough to threaten the usefulness of the canoe.

The most unusual feature of this canoe is observed on the underside of the bottom. A double set of deep channels run the full length of the bottom, one along each outer edge (Figures 4 and 7). These channels, or reverse keels, undoubtedly served as stabilizers to the canoe and strongly suggest that it was designed for use on waterways with a current, such as a river. They also would stabilize the canoe in a wind, particularly if being propelled by a single pole from the stern.

It is not clear how the two channels were cut in the bottom. They could, perhaps, have been quarried out with an axe by cutting at opposed angles to form a V-shaped channel the length of the hull, or another kind of tool like a curved adze, or a round bit chisel could have been used. A curved knife is an even stronger candidate since the walls of the groove are rounded and not V-shaped. Areas of the prow also indicate that the final finishing of the canoe was probably done with a curved knife.

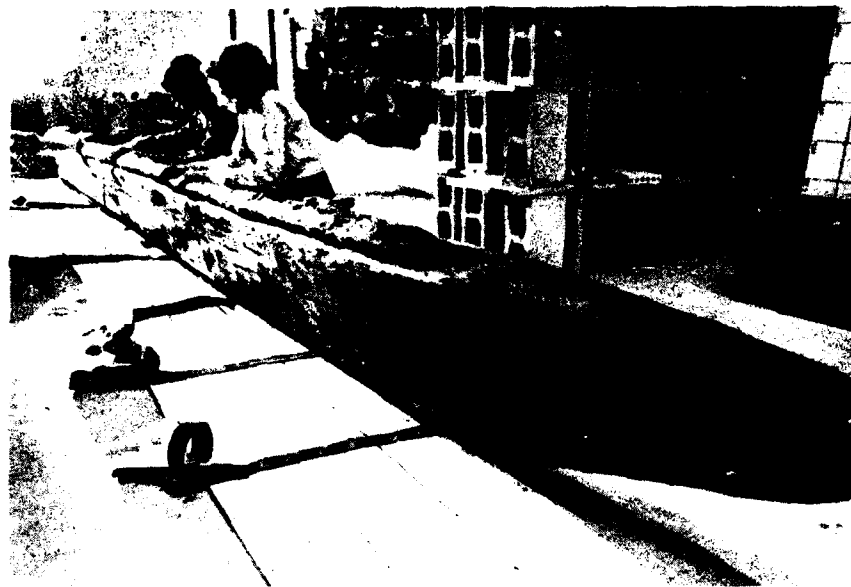


Figure 7a. Bottom of canoe showing grooves.



Figure 7b. Bottom of canoe showing grooves.

POST MANUFACTURE WEAR ON THE CANOE

All evidence of use wear comes from the prow and bottom of the canoe since only these areas had their original surface preserved in the mud. The surface of the wood is worn smooth (and subsequently etched to some degree) on the inner surface of the prow. The outside of the bottom is noticeably polished by sand and particles over which it was ridden.

There is no evidence of burning on the canoe, either from its manufacture or from its subsequent use. Eyewitness accounts of Timucua and other southeastern Indians in the seventeenth century (Fundaburk 1969) state that on a long trip cooking was done over fires built on the bottom of the canoe. These could have been built on mud or sand bases, however, which could leave little trace of the fire on the bottom of the craft.

PRESERVATION TECHNIQUES

The craft was carefully washed and cleaned of debris, photographed, measured, and examined by the three-person consultant team after it was moved to the field laboratory in Fulton, Mississippi. A fiberglass-over-plywood tank was built to house the canoe during treatment (Figure 8). This tank was built to operate similarly to the tank described by Murdock (1978) with a submersible pump which forced the solution through a perforated pipe within the vat to provide circulation and filtration of the polyethylene glycol (P.E.G.) solution. A thermostatically controlled water heater was attached to keep the temperature at least 100⁰ F to aid in penetration of the wood by the P.E.G.

Due to the relatively sound nature of the wood remaining on the dugout and project field time limitations, an eleven month treatment schedule was decided upon, using 540 gallons of Carbowax 1000, a product of P.E.G. The treatment schedule was as follows: (1) one month immersion at 10% solution; (2) 2 two months immersion at 25% solution; (3) eight months immersion at 50% solution.

During the preservation period, the vat was monitored daily by the Principal Investigator or a staff member. Only slight problems occurred such as small leaks or replacement of elements in the water heater. Through experimentation, it was found that circulation was best if the temperature of the solution was maintained at 120⁰ F. This did cause evaporation of the water in the mixture, however, and hot water was occasionally added to the vat. Once the 540 gallons of P.E.G. had been added to the solution, the level of the solution was kept just above the bow for eight months. It is estimated that with evaporation of the water due to heat and the lower than estimated volume of solution in the vat, that the solution was at least 70-80% P.E.G. On one occasion power in the area was off for over 12 hours, thereby ceasing circulation in the vat. The solution cooled and formed a crust 10-15 cm (0.3-0.5 ft) thick. This was melted with hot water and circulation was easily restored. No damage was done to the vessel.

Upon removal of the canoe from the preservation vat, it was placed on lumber supports on top of the vat. It was covered with a sheet of clear plastic and allowed to dry. A thin one centimeter film of white P.E.G. formed on the surface within four to five hours and as soon as it cooled, all seepage stopped.

The vessel was inspected daily for six weeks to check for shrinkage or twisting. None was observed, although measurements were not recorded.

It is interesting to note that the canoe had absorbed approximately 75 gallons of P.E.G. directly into the wood. This was measured in the recovery process of the P.E.G. The solution was heated to 180⁰ F and maintained for three days until all water had evaporated out. This was determined through the stabilization of the level of the solution in the vat. The P.E.G. was then pumped into the 54 gallon drums for future use. The recovered amount was 75 gallons less than that pumped into the vat.

The preservation of the Malone Lake canoe was very successful and allows the vessel to be displayed to the public. At normal room temperature (65 to 80⁰ F) or below, the canoe will be completely stable. It is suspected that temperatures above 100⁰ F should not be reached, for it could melt the P.E.G. solution.

For display purposes, the surface film of the canoe was removed by the simple method of sponging it off with hot tap water. This was performed in a small area of the canoe during the drying stage. The surface after the gentle sponging was excellent in color and texture. It was waxy to the touch and this was the only difference from its condition upon discovery 17 months prior to removal from the preservation solution.

HISTORICAL SIGNIFICANCE AND RELATIONSHIPS

In canoe dugout construction, the first known and longest used method is that of fire shaping. This is accomplished by the use of a constantly monitored fire to cut and shape the craft. In describing early Indian methods of dugout canoe construction, Swanton states that:

Canoes were hollowed out of single logs by means of fire. Speaking for the Coast Algonkians of North Carolina, White says that they placed gum or resin on the parts which they intended to burn in order to accelerate combustion. The trees used for this purpose were usually cypress, though some larger ones were made of cottonwood (1928:689).

It is safe to say that fire-shaped dugout canoes are of aboriginal manufacture prior to the introduction of metal-edged tools. As soon as metal tools became available, the technique of fire-hollowing was abandoned. There was approximately a 291-year period (1541-1842) in which the Malone Lake canoe could have been made by an aboriginal culture. This aboriginal culture at least in the later part of this period was that of the Chickasaw Indians, whose territory was northern Mississippi (Swanton 1952:93).



Figure 8. Preservation vat ready for use.

The Chickasaw first encountered Europeans in 1541 during the DeSoto expedition (ibid:178). The Europeans camped with the Chickasaw from January to March at which time the Chickasaw attacked the whites and were only narrowly defeated. After this encounter, little is known of the Chickasaw until the arrival of French explorers and colonists in the 17th century. During this time, the Chickasaw had established a friendly alliance with the English.

Although the French tried to make peace with them, English traders had effected establishments in their country even before the settlement of Louisiana, and they remained consistent allies of England while England and France were fighting for possession of North America. In the south their alliance meant much the same to the English as Iroquois friendship meant to them in the north. As practically all of the surrounding peoples were devoted to the French, and the Chickasaw were not numerous, they were obliged to maintain a very unequal struggle until the final victory of England in 1763, and they suffered severely in consequence (Swanton 1952:178).

At the end of the 18th century and the beginning of the 19th century, the Chickasaw population steadily dwindled due to white expansion which came after a series of treaties (1805, 1816, 1818, and 1832) concerned with the cession of Indian land. Virtually all of the remaining Chickasaw were relocated in Oklahoma by 1832 (Swanton 1922:420).

Thus the use of metal tools in the aboriginal construction of the Malone Lake dugout canoe is possible between the dates 1541-1832. That canoes played an important part in the lifeways of the Indians of this area for reasons other than mere transportation of goods and people is illustrated by the following description of how the Chickasaw and Cherokee drove the Shawnee Indians from the Cumberland River in 1745.

The Chickasaws formerly claimed for their nation, exclusively, all the lands north of the Tennessee, and they have denied that the Cherokees were joined with them in the war against the Shawnees when they were driven from their settlement in Cumberland. They said that the Shawnees first came up the Tennessee in canoes, and thence came to war with the Chickasaws, and killed several of their nation. The Chickasaw chiefs and warriors embodied and drove them off. From thence they went to the Creeks, and lived with them for some time. They then returned and crossed at the Chickasaw Old Field, above Muscle Shoals. (Swanton 1922:416).

There is no reason to assume that the Malone Lake craft could only have been built by Indians. White and black settlers in the Southeast commonly hewed out water craft and used them freely for inland waterway transport of goods and people. A recent study indicates that this practice was well known in Florida up until the late 19th and early 20th centuries (Willis 1978).

STYLISTIC VARIATION OF DUGOUT CANOES

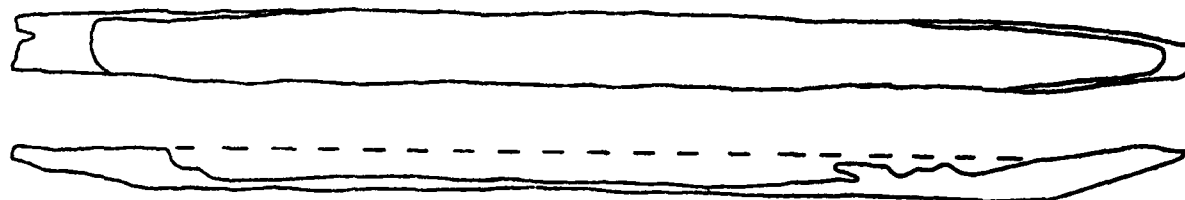
It is not known whether historic period craft were styled after Indian designs or Old World patterns. The early French historian Du Pratz says, "The bow of the Pirogue (dugout) is made sloping, like those which one sees on the French rivers" (Swanton 1911:67). In his study on Florida dugout canoes, Willis states that style seems to be "the function of tool types, cultural affinity, and environmental necessity" (1978:27, 28). The two most important of these functions are tool types (fire shaped versus metal tool worked) and environmental necessity (still pond or lake versus flowing or rough water).

Cultural affiliation of similar appearing canoes is quite difficult to prove due to the limited number of variables involved in the building of such a basic and functional vessel. The streamlined, upturned bow of the Malone Lake canoe is similar to two reported from Florida, both aboriginal (Figure 9f and 9g). Thus this stylistic common denominator is felt to reflect their environmental settings, a large flowing river and a large often rough water lake. "In order to ply these waters with speed and safety over long distances, a streamlined overhanging bow which would cut through and ride above waves while creating less drag would be the optimal design" (Willis 1978:29). This undoubtedly reflects the similarities noted by the Frenchman Du Pratz and the similarities in basic design of all the dugouts shown in Figure 9 despite different dates of manufacture, cultural affiliation, environment, geographic location, and function.

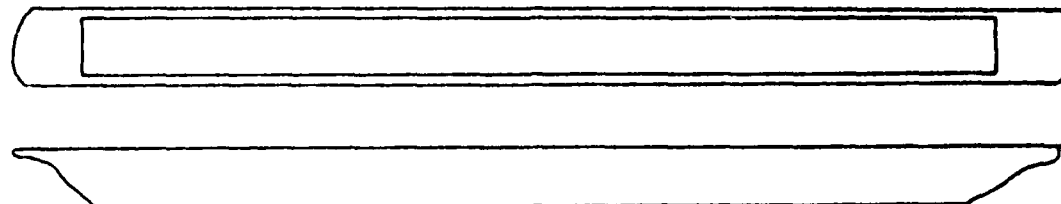
Of the very few dugouts described in the literature for the geographic area near Lake Malone, one from near Peavy's Landing, Alabama, some 100 miles downstream on the Tombigbee River (Stowe 1974:197-199), is closely comparable to the Malone Lake canoe. They are similar in size, although the Malone Lake canoe is about one meter longer (Figure 9). The width of cross sections and even the state of preservation are also similar. The gunwales of both are broken or missing in part, which indicates that the weakest part of this type of canoe was the long thin gunwales.

The greatest difference between the two is in the prow. The Peavy's Landing canoe has an overhang at the bow which matches that at the stern. It was in a sense "double-ended" and could be poled from either end without turning the canoe around. The Malone Lake canoe lacks this feature; it has a tapered prow and was clearly meant to travel in a single direction. Unfortunately, there is no description of the underside of the bottom of

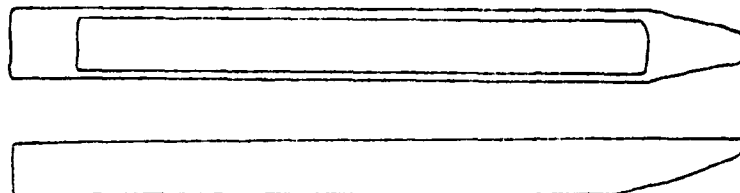
0 1 2 3 4 Meters



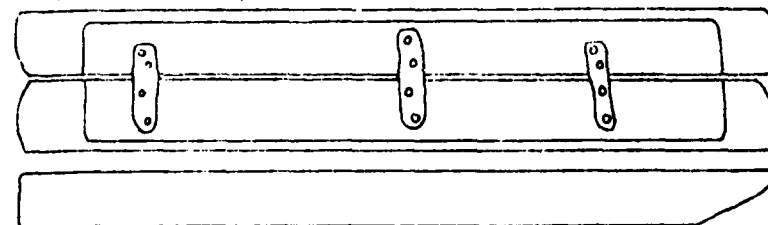
a. Malene Lake Canoe, Mississippi - (2000 ± 50) Historic Period - Riverine



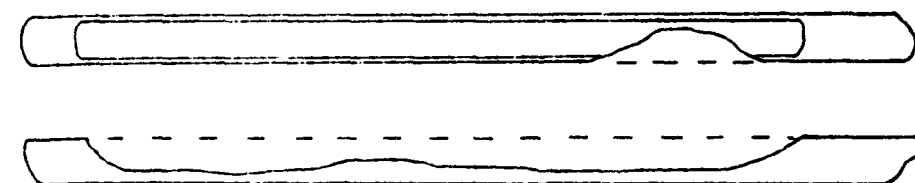
b. Peavy's Landing Canoe, Alabama - (4500 ± 100) Aboriginal - Riverine



c. Tony's Taxidermy Canoe, Florida - Historic Period - Small Lake



d. Little Orange Lake Tandem Canoe, Florida - Historic Period - Small Lake



e. Ricard's Canoe, Florida - (1500 ± 65) Aboriginal - Small Lake



f. Orange Lake Canoe, Florida
Aboriginal - Large Lake

g. Etheridge's Canoe, Florida
Aboriginal - Coastal estuarine

Figure 9. Various Dugout Canoe Styles.

the Peavy's Landing canoe. It is conceivable that it may have the underside channels for stability as well. The relatively old date of the Peavy's Landing canoe at 605±60 B.P. (Stowe 1971:197) is useful in providing time depth for some of the features of the Malone Lake canoe.

The comparison is interesting in that the date of the Peavy's Landing canoe could be considered the Chickasaw stylistic adaptation to the flowing riverine environment of the Tombigbee River. Thus the Malone Lake dugout could represent the retention of the aboriginal (Chickasaw) adaptations to either a riverine or perhaps a large lake environment (during the last segment of the Little Ice Age), along with modifications due to metal tools and new cultural practices. As reported in Florida by Willis, aboriginal canoes tend to be double-ended while historic period canoes are only shown as being unidirectional with a pointed bow and often a flat rear platform (1978). In addition, historic craft in Florida were overwhelmingly constructed out of cypress as was the Malone Lake canoe. The use of fire-hollowing in Florida craft seems to be restricted to the more resinous pine during prehistoric times.

Another similar dugout from Mississippi is the Georgetown/Rockport Canoe from the Pearl River in Copiah County (McGahey, personal communication:1982). The most similar features are the upturned prow and the pattern of construction marks inside the bottom. The prow is striking similar when viewed in slides provided by McGahey, Mississippi Department of Archives and History. This historic craft was dated at 340±70 B.P. (1610 A.D.) (UGA-3135). The dimensions of this canoe are 5.44 m long, 0.55 m height, 0.35 m width. A hole had been chopped in the bottom and had an accompanying peg. Apparently the vessel was not completed but was chopped through the bottom at an advanced stage.

Other Mississippi canoes (Table 1) include the "Tombigbee River" canoe, dated at 150±55 B.P. (A.D. 1800), a Natchez canoe with a hole drilled in the prow (McGahey 1974), the short and rough Steele Bayou Canoe (Lewis 1976) dated at 175±55 B.P. (1775 A.D.) (UGA-1352), and the Poplarville, Mississippi canoe dated at 185±45 B.P. (1765 A.D.) (UGA-2413) which had mooring holes (or notches) drilled in both ends.

From his work with the limited samples of canoes in Mississippi, McGahey suggests that there appear to be three forms of canoes:

1. The prehistoric form which has long, narrow, and parallel sides with a flat bottom and straight sides. A platform is usually at one or both ends with a hold drilled through (mooring ?).

Table 1. Known Mississippi Canoes

Canoe	Date	Form
Georgetown/Rockport	340+70 B.P. (1610 A.D.)	Early Historic
Natchez	150+55 B.P. (1800 A.D.)	Early Historic
Steele Bayou	175+55 B.P. (1775 A.D.)	?
Poplarville	185+45 B.P. (1765 A.D.)	Early Historic
Malone Lake	280+65 B.P. (1670 A.D.)	Early Historic
Van Cleave	no date	Late Historic
Cedar Creek	no date	Late Historic
de la Pointe	no date	Late Historic
Peavy's Landing	605+60 B.P. (1345 A.D.)	Prehistoric

2. The Early Historic forms which are unidirectional and similar to the Malone Lake canoe.
3. The Modern or Late Historic pirogue which is wider, shallow, more crude and oval in outline.

After the comparison with other vessels, both in Florida and Mississippi, it appears that the Malone Lake dugout canoe represents an Early Historic, unidirectional dugout craft, made with metal tools and designed to operate in a riverine or large lake environment. A positive cultural affiliation for the craft cannot be postulated. There are relatively few basic and readily preserved design options which are wholly culturally determined when one is hollowing out a log to make such a basic, functional water craft.

This sad truth is compounded by the fact that a discarded canoe seldom takes its "rightful place" in stratigraphically discrete midden deposits of its own culture. Instead, it usually floats, half waterlogged, for years along a lake shore or downstream in a river before finally, if ever, resting in a place free enough of bacteria and wood destroying organisms that it is preserved until the present day. Thus, not only does a canoe have few culturally determined basic design options, it seldom is preserved in direct provenience with its culture of manufacture. Canoes are like any wooden artifact in that very few are even preserved from the ravages of time.

This all combines to present the archaeologist with too small a sample of artifacts from which to make any definite or detailed stylistic-cultural correlations as is possible with artifacts of a more durable and numerous nature such as flint or ceramics. To shed light on this problem, a detailed, comparative study of all known dugout canoes in the Southeastern United States is needed. Only from such an indepth study could it be possible to make intelligent and hopefully statistically valid stylistic statements concerning the specific cultural origins of sporadically discovered finds such as the Malone Lake dugout canoe.

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APPENDIX A

PRESERVATION OF THE MALONE LAKE CANOE RESEARCH DESIGN

INTRODUCTION

The canoe which has been recovered from Malone Lake in Monroe County, Mississippi has been observed by the Principal Investigator. The canoe site at Malone Lake also has been observed prior to and after canoe removal. Due to the lack of an associated occupational site near the submerged canoe location, the canoe must be examined as an entity itself. Preliminary examination of the tool markings on the inside bottom of the craft indicate the possibility that a metal tool was used in construction. This brings in the consideration of possible historic construction.

The preservation of the Malone Lake canoe will be separated into four activities. These activities include research questions which can be addressed to this specialized resource; specific studies of the craft; preservation of the canoe; and documentation of the results of these efforts.

It should be explicitly stated that the entire canoe preservation and study will be under the direction of a well known canoe expert, Dr. Barbara A. Purdy of the University of Florida. She will be assisted by a graduate assistant, Mr. Raymond Willis. All activities such as the transportation, construction of a preservation container, and chemical mixing will be under the direction of Dr. Purdy and Mr. Willis. All research and reports will be performed by Mr. Willis and approved by Dr. Purdy. In addition, the outside consultants necessary will be approved by Dr. Purdy. The Principal Investigator for the overall project will provide the necessary coordination of personnel, transportation, construction, and supplies for all canoe activities.

The necessary research, dating, tree identification, and report writing can be performed at the consultant's home Universities, away from the preservation facility in the Fulton, Mississippi laboratory.

RESEARCH STUDY DESIGN

The research study design for the study of the Malone Lake canoe will encompass those broad goals of the prehistoric mitigation program in the Tombigbee River Multi-Resource District which can be applied to this specialized resource. In addition, the design will include background research specific to canoe use and manufacture in the Southeast in general and in this area in particular (Chickasaws, Choctaws, Creeks). This research will then be used to better investigate the specific studies of the Malone Lake Canoe into the known patterns of canoe use and manufacture.

The broad goals of the prehistoric mitigation plan for the District which can be addressed in the canoe study include resource utilization and possibly the transition between major cultural thresholds. The precise use of wood in prehistoric cultures in the Southeast has been a nagging and usually unaddressable question of prehistoric archaeologists. Our knowledge is limited to those few sites with both organic preservation and archaeological study. Wood was abundantly available and it is assumed from the ethnographic observations that prehistoric cultures utilized this resource regularly. Bullen and others

have dated canoes in Florida to 1000 B.C. (Purdy, personal communication) and earlier use is assumed. If, however, the Malone Lake canoe is documented to be historic (1500-1832), then the transition from the prehistoric to historic threshold can also be addressed in this study. Perhaps the style, kind of wood or manufacturing process changed with the introduction of metal tools. Metal tools were one of the first European items which were quickly acquired by the Southeastern Indian groups. Crucial to this aspect of the research design are the radiocarbon dates of the canoe and the determination of the tool kit used to make the canoe. Contact with Europeans in this area dates from the DeSoto expedition in 1540-1542, therefore, the craft could have been produced during the protohistoric or the fully historic period.

The background research will include the ethnographic and archaeological information available and pertinent to the Malone Lake canoe. The questions which will be addressed are use, manufacture, style, and temporal/stylistic relationships. The date recovered from the specialized studies of the canoe then will be compared to this research. The result of this comparison will integrate the Malone Lake Canoe on a local, areal, and regional level.

SPECIAL STUDIES

Radiocarbon Dating

Samples from the gunwales of the craft will be sent to two radiocarbon laboratories for the determination of the age of the tree used for the canoe. In addition, a sample may be extracted from the keel, bow, or stern for cross-checking purposes.

Two factors should be held in consideration of the radiocarbon date if the canoe is indeed historic. First, virgin trees in excess of 500 years old are well documented in the Southeast. Therefore, a prehistoric date could be retrieved from a historic canoe if the prehistoric portion of the tree was used for manufacture. Second, the standard deviation of the radiocarbon date could easily overlap the prehistoric/historic time line.

Wood Identification

A specialist in tree anatomy will identify the wood from which the canoe was manufactured. If the data are there, other questions of the age of the tree and the nature of the life of the tree as based on the tree-ring record in the canoe will be addressed by this specialist.

Analysis of Tooling Marks

The questions addressed in this study will include the type and material of tools, the technology of tool manufacture and the date range when these tools were available in the Tombigbee Valley. The specialist will meet the highest standards of woodworking tool analysis as this is a crucial aspect of the project.

DOCUMENTATION AND REPORTS

The contractor will submit monthly progress reports to the contracting offices. These will contain an up-to-date account of all work conducted during the preceding month including field and laboratory work.

Time and task forms will be completed for all canoe activities which are considered worthy of measure by the Principal Investigator and the canoe specialist. The Dugout Canoe Data form provided by the government will be completed by the contractor.

A draft final report for the canoe will be submitted for review. This will be prepared by the canoe consultant and her staff. This report will include the following:

1. A complete description of the canoe and a reconstructed description of the environmental setting to the highest level possible in consideration that the site has been destroyed and was not seen by the canoe experts.
2. A complete discussion of the methods and techniques utilized in the canoe study.
3. The research questions addressed on each level of the work will be extensively developed. This includes those derived from the general research design (5a), the specific canoe research questions and questions developed to address observations made during the field and lab phases of the work.
4. A complete bibliography listing all sources and references consulted as well as technical appendices as required for special studies.

Ten copies of the draft report will be submitted for review 120 days after the craft is submerged. It is understood that any requested changes will be identified and returned to the contractor within 60 days. Additional drafts, if required, will not be additionally funded.*

Seventy-five copies and a camera-ready manuscript of the final report will be provided by the contractor within 60 days of receipt of necessary changes. All other specifications of Section 6.3 (8-10) will be followed.

*Verbal agreement between Dr. Bense and Raymond Willis at time of canoe inspection stipulated that Mr. Willis would only be responsible for the cost of submission of these ten copies. The seventy-five final copies of the report will be produced from other project funds.

